

CLAIMS

What is claimed is:

1. An endoscope comprising a pliable tube having an integument layer made of a resin constituting an insertion portion and at least one slender tube element inserted through the insertion portion, wherein:

the amount of contraction of the pliable tube after application of a thermal load during a high-pressure steam sterilization step is set larger than the amount of contraction of the tube element after the application of the thermal load during the high-pressure steam sterilization step.

2. The endoscope according to Claim 1, wherein:

the pliable tube comprises the integument layer and a metal tube installed integrally on the inner perimeter surface side of this integument layer;

the integument layer is formed from a resin having a thermal deformation temperature equivalent to or less than a temperature applied during the high-pressure steam sterilization step; and

the metal tube is formed in the pliable tube formation conditions while being extended compared with being in the natural length conditions.

3. The endoscope according to Claim 2, wherein:

the metal tube comprises a helical tube formed from a metal strip and a mesh-shaped tube formed from a thin metal wire; and

at least one of the helical tube and the mesh-shaped tube is formed in the pliable tube formation conditions while being extended compared with being in the natural length conditions.

4. The endoscope according to Claim 1,

wherein the integument layer is formed from a resin having a thermal deformation temperature equivalent to or less than a temperature applied during the high-pressure steam sterilization step, and the integument layer is formed in the pliable tube formation conditions while being extended compared with being in the natural length conditions.

5. The endoscope according to Claim 1,

wherein the tube element is a channel tube of a fluid transportation tube for transporting a fluid or of an endotherapy product insertion channel.

6. The endoscope according to Claim 1,

wherein the integument layer of the pliable tube is formed from any one of ester-based thermoplastic elastomer, amide-based thermoplastic elastomer, styrene-based resin, fluorine-based rubber, and silicon-based rubber, or a resin member made by blending them.

7. A manufacturing method for an endoscope provided with a pliable tube comprising an integument layer formed from a resin and a metal tube fitted integrally into this integument layer in an insertion portion, comprising the steps of:

extending the metal tube by a predetermined amount compared with the length in the natural length conditions; and

forming the integument layer around the metal tube extended,

wherein the predetermined amount is larger than the amount of contraction of the pliable tube due to high-pressure steam sterilization.

8. The manufacturing method according to Claim 7,

wherein the step of forming the integument layer is a step of forming the integument layer by extruding a molten resin around the metal tube extended.

9. The manufacturing method according to Claim 7,

wherein the step of forming the integument layer is a step of forming the integument layer by applying a covering of tube element made of a resin to become the integument layer around the metal tube extended.

10. A manufacturing method for an endoscope provided with a pliable tube comprising an integument layer formed from a resin and a metal tube fitted integrally into this

integument layer in an insertion portion, comprising the steps of:

forming the pliable tube by forming the integument layer by extruding a molten resin around the metal tube; and extending the pliable tube by a predetermined amount compared with the length in the natural length conditions by applying a tensile force in the axis direction during solidification of the resin,

wherein the predetermined amount is larger than the amount of contraction of the pliable tube due to high-pressure steam sterilization.